

CLAIMS:

What is claimed is:

1. A method for booting a non-uniform-memory-access
5 (NUMA) machine, comprising:
 configuring a plurality of standalone, symmetrical
multiprocessing systems to operate within a NUMA system;
 assigning a NUMA identification to each of the
multiprocessing systems, wherein each identification is
10 unique; and
 booting the multiprocessing systems in NUMA mode in
one-pass, wherein memory coherency is established at the
beginning of the execution of the system firmware.
- 15 2. The method according to claim 1, wherein the step of
configuring the multiprocessing systems further
comprises:
 configuring and testing host processors and memory;
 configuring and testing NUMA memory;
20 loading firmware image into local memory and
informing a hardware system console of the firmware
version;
 receiving a confirmation from the hardware system
console that the firmware version is the same for all
25 multiprocessing systems in the NUMA system;
 configuring NUMA adapters to connect each
multiprocessing system to the NUMA system and
initializing all host processors; and
 releasing all host processors to execute system
30 firmware.

3. The method according to claim 1, further comprising:
selecting a nodal master processor within each
multiprocessing system and designating all other
processors within each system as nodal slave processors;
5 and
selecting a NUMA master processor from among the
separate nodal master processors and designating all
other nodal master processors as NUMA slave processors.
- 10 4. The method according to claim 3, further comprising:
performing one-to-one handshaking between the nodal
master processor and each nodal slave processor within a
multiprocessing system, wherein the handshaking
synchronizes the time base register of all nodal slave
15 processors with the nodal time base source; and
switching the nodal slave processors in each
multiprocessing system to a hyper-visor environment in
which the nodal slave processors become NUMA slave
processors.
- 20 5. The method according to claim 3, wherein the NUMA
master processor:
loads a single operating system into NUMA system
memory;
25 transfers control to the operating system; and
runs operating system code which assigns all slave
processors to a designated place within the NUMA
operating system.
- 30 6. A system for booting a non-uniform-memory-access
(NUMA) machine, comprising:

a plurality of hardware-configuring components which configure a plurality of standalone, symmetrical multiprocessing systems to operate within a NUMA system;

an identification component which assigns a NUMA
5 identification to each of the multiprocessing systems, wherein each identification is unique; and

a booting mechanism which boots the multiprocessing systems in NUMA mode in one-pass, wherein memory coherency is established at the beginning of the
10 execution of the system firmware.

7. The system according to claim 6, wherein each hardware-configuring component further comprises:

a host testing component which configures and tests
15 host processors and memory;

a NUMA testing component which configures and tests NUMA memory;

a software loading mechanism which loads a firmware image into local memory and informs a hardware system
20 console of the firmware version;

a receiving component which receives a confirmation from the hardware system console that the firmware version is the same for all multiprocessing systems in the NUMA system;

25 an adapter-configuring component which configures NUMA adapters to connect each multiprocessing system to the NUMA system and initializing all host processors; and

a releasing mechanism which releases all host processors to execute system firmware.

8. The system according to claim 6, further comprising:
a plurality of nodal selection mechanisms which
select a nodal master processor within each
multiprocessing system and designate all other processors
5 within each system as nodal slave processors; and

a NUMA selection mechanism which selects a NUMA
master processor from among the separate nodal master
processors and designates all other nodal master
processors as NUMA slave processors.

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9. The system according to claim 8, further comprising:

a handshaking mechanism which performs one-to-one
handshaking between the nodal master processor and each
nodal slave processor within a multiprocessing system,
15 wherein the handshaking synchronizes the time base
register of all nodal slave processors with the nodal
time base source; and

a switching mechanism which switches the nodal slave
processors in each multiprocessing system to a
20 hyper-visor environment in which the nodal slave
processors become NUMA slave processors.

10. The system according to claim 8, wherein the NUMA
master processor:

25 loads a single operating system into NUMA system
memory;

transfers control to the operating system; and

runs operating system code which assigns all slave
processors to a designated place within the NUMA

30 operating system.

11. A computer program product in a computer readable medium for use in a data processing system, for booting a non-uniform-memory-access (NUMA) machine, the computer program product comprising:

5 instructions for configuring a plurality of standalone, symmetrical multiprocessing systems to operate within a NUMA system;

instructions for assigning a NUMA identification to each of the multiprocessing systems, wherein each
10 identification is unique; and

instructions for booting the multiprocessing systems in NUMA mode in one-pass, wherein memory coherency is established at the beginning of the execution of the system firmware.

15 12. The computer program product according to claim 11, wherein the step of configuring the multiprocessing systems further comprises:

instructions for configuring and testing host
20 processors and memory;

instructions for configuring and testing NUMA memory;

instructions for loading firmware image into local memory and informing a hardware system console of the
25 firmware version;

instructions for receiving a confirmation from the hardware system console that the firmware version is the same for all multiprocessing systems in the NUMA system;

instructions for configuring NUMA adapters to
30 connect each multiprocessing system to the NUMA system and initializing all host processors; and

instructions for releasing all host processors to execute system firmware.

13. The computer program product according to claim 11,
5 further comprising:

instructions for selecting a nodal master processor within each multiprocessing system and designating all other processors within each system as nodal slave processors; and

- 10 instructions for selecting a NUMA master processor from among the separate nodal master processors and designating all other nodal master processors as NUMA slave processors.

- 15 14. The computer program product according to claim 13, further comprising:

instructions for performing one-to-one handshaking between the nodal master processor and each nodal slave processor within a multiprocessing system, wherein the
20 handshaking synchronizes the time base register of all nodal slave processors with the nodal time base source; and

- instructions for switching the nodal slave processors in each multiprocessing system to a
25 hyper-visor environment in which the nodal slave processors become NUMA slave processors.

15. The computer program product according to claim 13, wherein the NUMA master processor:

- 30 loads a single operating system into NUMA system memory;

transfers control to the operating system; and
runs operating system code which assigns all slave
processors to a designated place within the NUMA
operating system.

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16. A system for booting a non-uniform-memory-access
(NUMA) machine, comprising:

a plurality of hardware-configuring components which
configure a plurality of standalone, symmetrical

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multiprocessing systems to operate within a NUMA system;

a host testing component which configures and tests
host processors and memory;

a NUMA testing component which configures and tests
NUMA memory;

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a software loading mechanism which loads a firmware
image into local memory and informs a hardware system
console of the firmware version;

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a receiving component which receives a confirmation
from the hardware system console that the firmware
version is the same for all multiprocessing systems in
the NUMA system;

an adapter-configuring component which configures
NUMA adapters to connect each multiprocessing system to
the NUMA system and initializing all host processors;

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a releasing mechanism which releases all host
processors to execute system firmware;

an identification component which assigns a NUMA
identification to each of the multiprocessing systems,
wherein each identification is unique;

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a plurality of nodal selection mechanisms which
select a nodal master processor within each

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multiprocessing system and designate all other processors within each system as nodal slave processors;

5 a NUMA selection mechanism which selects a NUMA master processor from among the separate nodal master processors and designates all other nodal master processors as NUMA slave processors;

10 a switching mechanism which switches the nodal slave processors in each multiprocessing system to a hyper-visor environment in which the nodal slave processors become NUMA slave processors; and

a booting mechanism which boots the multiprocessing systems in NUMA mode in one-pass, wherein memory coherency is established at the beginning of the execution of the system firmware.